

GENERAL APPEARANCE OF THE PATIENT

CHAPTER 6

Mental Status Examination

KEY TEACHING POINTS

- Several brief, well-validated bedside tests are available to diagnose dementia or delirium. These tests are accurate when compared to more cumbersome and lengthy neuropsychiatric standards.
- The clock-drawing test, Mini-Cog test, and Mini-Mental Status Examination (MMSE) each accurately diagnoses dementia.
- The Confusion Assessment Method accurately diagnoses delirium.

I. INTRODUCTION

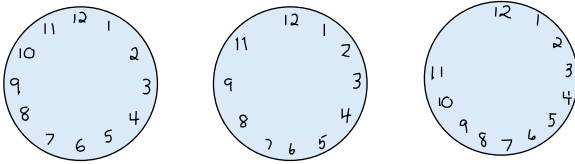
Dementia is a clinical syndrome characterized by deteriorating cognition, behavior, and autonomy that affects 9% to 13% of adults older than 65 years living in the community.¹ Before diagnosing dementia, clinicians must exclude delirium (i.e., acute confusion; see the section on [Diagnosis of Delirium](#)).

Of the many simple and rapid bedside tests developed to diagnose dementia, the most extensively investigated ones are the clock-drawing test, Mini-Cog test, and Mini-Mental Status Examination (MMSE).

II. CLOCK-DRAWING TEST

The clock-drawing test was originally developed in the early 1900s to evaluate soldiers who had suffered head wounds to the occipital or parietal lobes, injuries that often led to difficulty composing images with the appropriate number of parts, correct size, and orientation (i.e., constructional apraxia).² To depict a clock, patients must be able to follow directions, comprehend language, visualize the proper orientation of an object, and execute normal movements—all tasks that may be disturbed in dementia.

Normal patterns:



Abnormal patterns:

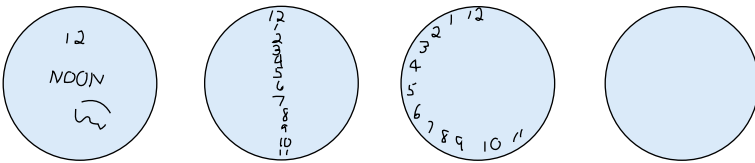


FIG. 6.1 THE CLOCK-DRAWING TEST (WOLF-KLEIN METHOD). The clock-drawing test is considered normal if the patient has included most of the 12 numbers in the correct clockwise orientation. The patient does not need to draw the hands of the clock, and abnormal spacing of the numbers, however inappropriate, is still regarded as normal as long as the numbers are in the correct order and near the rim. Normal clock-drawing patterns, from left to right, are “normal,” “missing one number,” and “inappropriate spacing.” Abnormal clock-drawing patterns, from left to right, are “irrelevant figures,” “unusual arrangement” (i.e., vertical orientation of numbers), “counterclockwise rotation,” and “absence of numbers.” (Based upon reference 4.)

A. TECHNIQUE AND SCORING

There are at least a dozen different methods for performing and scoring the clock-drawing test, some with intricate grading systems that defeat the test’s simplicity.³ In a simple and well-investigated method,⁴ the clinician gives the patient a piece of paper with a preprinted circle 4 inches in diameter and asks the patient to draw a clock. If the patient has any questions, the clinician only repeats the same instructions and gives no other guidance. The patient may take as long as he or she wants to complete the task. Fig. 6.1 describes how to score the drawing.

B. CLINICAL SIGNIFICANCE

In patients without other known causes of constructional apraxia (e.g., parietal lobe lesion), a positive clock-drawing test increases the probability of dementia (likelihood ratio [LR] = 5.3, EBM Box 6.1). A normal clock-drawing test is a less useful result and can be elicited from many patients with dementia as defined by other measures. In contrast to the MMSE, the clock-drawing test is unaffected by the patient’s level of education.⁵

III. MINI-COG TEST

A. TECHNIQUE AND SCORING

The Mini-Cog test combines a clock-drawing test with tests of recall to provide a brief screening tool suitable for primary care patients, even those who do not speak English as their native language.⁹ To perform the test, the clinician asks the patient to register

**EBM BOX 6.1***Dementia and Delirium**

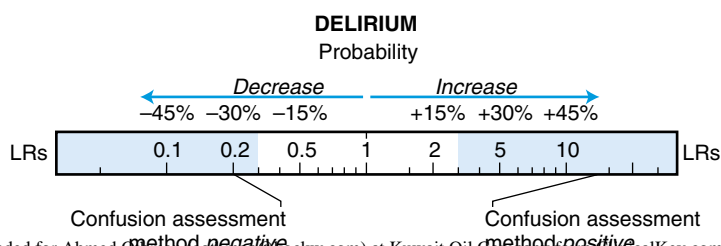
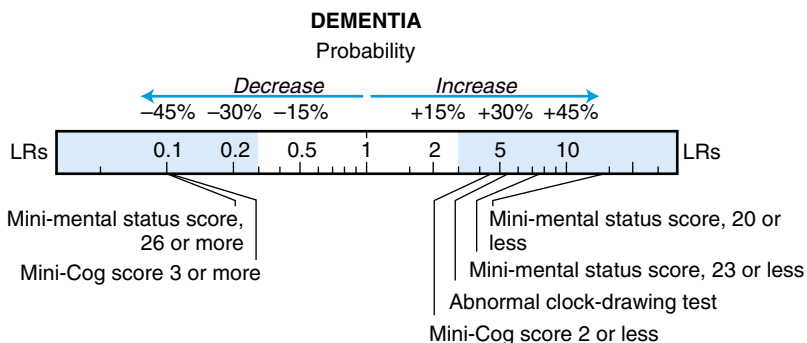
Finding (Reference) [†]	Sensitivity (%)	Specificity (%)	Likelihood Ratio [‡] if Finding Is	
			Present	Absent
Dementia[†]				
Abnormal clock-drawing test ⁴⁻⁸	36-75	72-98	5.3	0.5
Mini-Cog score 2 or less ⁹⁻¹⁴	75-99	59-93	4.5	0.1
Mini-Mental Status Examination: traditional threshold				
23 or less ^{10,14-28}	53-100	71-99	7.7	0.2
Mini-Mental Status Examination: 3 levels^{17,19-21,26}				
20 or less	29-69	93-99	14.4	—
21-25	26-57	—	2.1	—
26 or more	4-14	14-31	0.1	—
Delirium				
Positive test using Confusion Assessment Method ^{†,29-38}	46-98	83-99	12.7	0.2

*Diagnostic standard: for *dementia*, dementia by NINCDS-ADRDA criteria,^{4,5,39,40} DMS criteria,^{7-16,18,19,21,23,24,26,28} CAMDEX instrument,¹⁷ AGE-CAT,^{22,25} or neurologist opinion;^{20,27} for *delirium*, the DMS criteria.^{22,29-38}

[†]Definition of findings: for abnormal clock-drawing test, see Fig. 6.1; for Mini-Cog test and Confusion Assessment Method, see text.

[‡]Likelihood ratio (LR) if finding present = positive LR; LR if finding absent = negative LR. NS, Not significant.

[Click here to access calculator](#)



three unrelated words (e.g., *banana*, *sunrise*, and *chair*) and then asks him or her to draw a clock, stating, “Draw a large circle, fill in the numbers on a clock face, and set the hands at 8:20.” The patient is allowed 3 minutes to draw the clock, and instructions may be repeated if necessary. After drawing the clock (or after 3 minutes have elapsed), the patient is asked to recall the three words. The Mini-Cog is scored by assigning 1 point for each word recalled (scores range from 0 to 3) and 2 points for a “normal” clock, which should have the correct orientation and spacing of numbers and hands. An “abnormal” clock receives 0 points, thus creating a possible score range of 0 to 5.⁴¹

B. CLINICAL SIGNIFICANCE

As displayed in [EBM Box 6.1](#), a Mini-Cog score of 2 or less increases the probability of dementia (LR = 4.5). A score of 3 or more decreases the probability of dementia (LR = 0.1).

IV. MINI-MENTAL STATUS EXAMINATION

A. INTRODUCTION

The MMSE ([Table 6.1](#)) was introduced by Folstein in 1975 as an 11-part bedside test requiring only 5 to 10 minutes to administer—a much briefer time frame compared to the 1 to 2 hours required by more formal tests of dementia.⁴²

B. CLINICAL SIGNIFICANCE

[EBM Box 6.1](#) illustrates that, assuming there is no evidence of delirium (see the section on [Diagnosis of Delirium](#)), an MMSE score of 23 or less increases the probability of dementia (LR = 7.7), whereas a score of 24 to 30 decreases it (LR = 0.2). Nonetheless, because false-positive results become a concern when applying this threshold to large populations with a low incidence of dementia (such as elderly persons living independently), some experts prefer interpreting the MMSE score in 3 ranges (see [EBM Box 6.1](#)): a score of 20 or less indicates the presence of dementia (LR = 14.4); one of 26 or more rules out dementia (LR = 0.1); and scores of 21 to 25 are regarded as less conclusive (LR = 2.1), thus prompting further investigation.

The MMSE score may be used to follow patients over time, but only changes of 4 points or more reliably indicate a change of cognition.⁴³ The level of the patient's education also affects the MMSE score, regardless of the presence of dementia,^{16,44} and some have suggested adjusting the threshold for a positive test downward slightly in more poorly educated persons.¹⁶

V. DIAGNOSIS OF DELIRIUM (CONFUSION ASSESSMENT METHOD)

Delirium is an acute and reversible confusional state that affects up to 20% of elderly patients hospitalized with acute medical illnesses.³⁰ Of the several screening tools available to diagnose delirium,³⁰ one simple and well-investigated one is the Confusion Assessment Method.²⁹

A. SCORING

When administering the Confusion Assessment Method, the clinician looks for the following four clinical features: (1) change in mental status (compared to the

TABLE 6.1 The Mini-Mental Status Examination

Test	Maximum Score
ORIENTATION	
1. What is the year? Season? Date? Day? Month?*	5
2. Where are we? State? County? City? Hospital? Floor?*	5
REGISTRATION	
3. Name three objects. Ask patient to name the items.* Repeat the answers until the patient learns all three.	3
ATTENTION AND CALCULATION	
4. Serial 7s: Ask the patient to begin with 100 and count backward by 7s, stopping after 5 subtractions: 93, 86, 79, 72, 65.* Or Spell “world” backward.*	5
RECALL	
5. Ask the patient to name the three objects learned under “registration” above.*	3
LANGUAGE	
6. Point to a pencil and watch, asking the patient to name them.*	2
7. Have the patient repeat “no ifs, ands, or buts.”	1
8. Have the patient follow a three-stage command (e.g., “Take a paper in your right hand. Fold the paper in half. Put the paper on the floor”).*	3
9. Have the patient read and obey the following sentence, written in large letters: “Close your eyes.”	1
10. Have the patient write a sentence.†	1
11. Have the patient copy a picture of two intersecting pentagons.	1
Total	30

*Give one point for each correct answer.

†The sentence should make sense and contain a subject and object to earn the 1 point; spelling errors are ignored.

Based upon references 21,42.

patient’s baseline) that is *acute* and *fluctuating*; (2) difficulty focusing attention or trouble keeping track of what is being said; (3) disorganized thinking (e.g., rambling or irrelevant conversation, unpredictable switching between subjects, illogical flow of ideas); and (4) altered level of consciousness (e.g., lethargic, stuporous, or hyperalert).

A positive test requires both features (1) and (2) *and* either (3) or (4).

B. CLINICAL SIGNIFICANCE

As illustrated in [EBM Box 6.1](#), a positive test argues strongly for delirium (LR = 12.7) and a negative test argues *against* delirium (LR = 0.2). Another version of this test, adapted for use in mechanically ventilated patients who cannot talk, has similar accuracy.^{45,46} In any patient with delirium, positive bedside tests for *dementia* are inaccurate because of a high false-positive rate.

The references for this chapter can be found on www.expertconsult.com.

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